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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/632,507	08/01/2003	Malika Dothresa Carter	HSJ920030188US1	4388

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EXAMINER	
PRUCHNIC, STANLEY J	

ART UNIT	PAPER NUMBER
2859	

DATE MAILED: 06/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/632,507	CARTER ET AL.	
	Examin r	Art Unit	
	Stanley J. Pruchnic, Jr.	2859	

-- The MAILING DATE of this communication app ars on the cover sheet with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-4 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-4 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 01 August 2003 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 8/1/03 (1 Sheet)
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The references listed in the information disclosure statement (IDS) or PTO-1449 submitted by Applicant on 8/1/03 are acknowledged. The cited references have been considered as indicated by the examiner's initials next to each reference considered.

However the foreign patent(s) and/or document(s) cited by applicant are considered only to the extent they could be understood from the abstract and drawings. Note that the Examiner is citing JP 4 120440 A in the attached PTO form 892.

Drawings

2. The drawings are objected to because Fig. 5 has incorrect spelling: *e.g.,* In Block 512, the word "SUFFICEINT" should be --SUFFICIENT--; and in block labeled 514, "LOOSES" should be spelled --LOSES--. Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claims 1-4 are objected to because of the following informalities:

- In Claim 1, in Line 2, please delete the acronym "VTGA" and replace therefor the phrase -- **vacuum thermogravimetric analyzer (VTGA)**-- in order to more clearly describe the invention.

- In Claim 4, in Line 2, please delete the acronym "VTGA" and replace therefor the phrase -- **vacuum thermogravimetric analyzer (VTGA)**-- in order to more clearly describe the invention.

- In each of Claims 1 and 4 (in Claim 1, Lines 1-2 and in Claim 4, Lines 1-2), in the preamble, the claim provides for "using a set of calibration standards comprised of a plurality of ferromagnetic slugs..." but, in the body of the claims, in each case, the claim does not set forth any steps involved in using a set of calibration standards. For consideration as to the merits, the method is considered to be a --**method of calibrating a vacuum thermogravimetric analyzer (VTGA)**-- as claimed by Applicant in Claims 1 and 4, and is not considered to require use of more than the singular slug introduced in Line 3.

- In each of Claims 2 and 3, the limitation "each of said ferromagnetic slugs" lacks antecedent basis, since it has not been positively claimed. Moreover, the particular materials of the ferromagnetic slugs are not considered to further limit the claimed method, since they do not affect the method in a manipulative sense.

- In Claim 1, Line 12, please insert --an-- before "amount" in order to more clearly describe the invention, correcting the grammar and providing antecedent basis.

- In each of Claims 1 and 4, please clarify the language describing the set-point temperatures to indicate that the set-point temperature and corresponding VTGA temperature are different during the second time interval than the respective other set-point temperatures, for example.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. ***Claims 1 and 4*** are rejected under 35 U.S.C. 103(a) as being unpatentable over **NOREM** (U. S. Patent No. 3,554,001) in view of ASTM E1582-00, "Standard Practice for Calibration of Temperature Scale for Thermogravimetry," published by ASTM in April 2001, hereinafter referred to as **ASTM E1582-00**.

The recitation "using a set of calibration standards comprised of a plurality of ferromagnetic slugs..." has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Moreover, NOREM discloses or suggests a method of using a set of calibration standards comprised of a plurality of ferromagnetic slugs (Col. 4, Lines 38-46) to provide a temperature calibration for a VTGA.

Regarding the TGA disclosed by NOREM being a VTGA: NOREM discloses vacuum pump 17 and sealed chamber 10 (Col. 2, Line 66-Col. 3, Line 8) for evacuating the enclosure to a desired pressure, therefore the TGA disclosed by NOREM is inherently a "Vacuum TGA", capable of operation at reduced pressure, by means of the vacuum pump 17 and sealed chamber 10.

NOREM discloses or suggests all the limitations as claimed by Applicant in Claim 1, disclosing a method of using a set of calibration standards comprised of a plurality of ferromagnetic slugs to provide a temperature calibration for a VTGA comprising:

determining the Curie temperature of a slug (a material standard 72; Col. 4, Lines 17-19);

placing the slug 72 in a sample holder (See Fig. 2; container 16; Col. 4, Lines 19-24) of a VTGA within a magnetic field (Col. 4, Lines 12-17; 23-26);

setting an initial temperature of a predetermined programmed temperature range, heating the standard material (slug 72) through a programmed temperature range, whereby the Curie point of the standard material will be reached and the indicated weight of the standard material will vary from its apparent weight to its gravimetric weight (Col. 4, Lines 26-37).

NOREM further discloses that, while heating the container over a predetermined range of temperatures, if the Curie point is reached, the temperature at which the slug loses magnetization is recorded as the apparent Curie temperature of the slug, in order to correct the indicated temperature scale (Col. 2, Lines 17-35).

NOREM as described above, does not explicitly teach continuing the temperature-setting program if the slug does not lose magnetization as claimed by Applicant, but it is disclosed by NOREM that the Curie point of the standard material "will be reached" while the furnace heats the standard material through the programmed temperature range (Col. 4, Lines 27-31), so inherently the increasing of the temperature is repeated if the slug has not yet lost its magnetization, as claimed by Applicant in Claims 1 and 4.

NOREM does not disclose that there is any particular *a priori* numerical relationship established between ***an initial set-point numerical value***, *e.g.,* the voltage, functioning as the "set-point temperature" and any actual or indicated numeric temperature value of the VTGA. NOREM as described above, does not disclose any particular starting "indicated temperature", and teaches it is necessary for calibration to include the "actual Curie point temperature" within the "predetermined range", but does not teach "setting a temperature of the VTGA to a temperature corresponding to ***a set-***

point temperature ***greater than*** ***the Curie temperature*** of the slug by an amount equal to a first offset value" as claimed by Applicant in Claim 1, or wherein the offset value is about 10 degrees C as claimed by Applicant in Claim 4.

NOREM further discloses that a slowly varying voltage represents the "setpoint temperature" from the program source 60 (Col. 5, Lines 3-40), which would result in a slowly varying actual temperature at the specimen. NOREM recognizes that vacuum conditions in a TGA result in "thermal lag introduced by the apparatus" which can reduce the desired accuracy of the measurements (Col. 1, Lines 48-61). Instead of relying on a sensed temperature, such as by positioning a thermocouple near the sample container, NOREM uses a coil 52 wound about the furnace body for temperature sensing and for heating (Col. 3, Lines 34-42).

NOREM as described above, does not explicitly teach an incrementally stepped temperature setting program as claimed by Applicant:

"***holding*** the temperature of the VTGA at a temperature corresponding to a set-point temperature ***for a first time interval*** sufficient to allow the VTGA to thermally equilibrate" (or holding for "about 1 hour", as claimed by Applicant in Claim 4);

"***increasing*** the temperature of the VTGA to a set-point temperature greater than an immediately preceding set-point ***by an amount equal to a second offset value***" as claimed by Applicant in Claim 1 (or wherein the new set-point value is about 2 degrees C higher than the previous set-point value, and the temperature is set to be increased at a rate of about 5 degrees/min as claimed by Applicant in Claim 4); and

"***holding*** the temperature of the VTGA at a temperature corresponding to a set-point temperature ***for a second time interval*** sufficient to allow the VTGA to thermally equilibrate (or holding for "about 2 hours", as claimed by Applicant in Claim 4).

NOREM, to summarize, is shown to teach all of the limitations as claimed by Applicant in Claims 1 and 4, with the exception of **(1)** an initial set-point numerical value (a temperature corresponding to a set-point temperature) being greater than the Curie Temperature; and **(2)** an incrementally stepped temperature setting program including

increasing set-point temperatures by particular offset values and holding the set-point temperatures for particular time intervals as claimed by Applicant.

With respect to (1): the step of "*setting a temperature* of the VTGA to a temperature *corresponding* to *a set-point temperature* ***greater than*** *the determined Curie temperature* of the slug by an amount equal to a first offset value", or about 10 deg. C:

NOREM, *as described above*, teaches that it is necessary that the predetermined range include a set-point temperature that will result in the actual temperature of the slug to equal the Curie temperature of the slug, since NOREM states that the Curie point of the standard material "will be reached" while the furnace heats the standard material through the programmed temperature range (Col. 4, Lines 27-31). NOREM further discloses that a slowly varying voltage represents the "setpoint temperature" from the program source 60 (Col. 5, Lines 3-40), which would result in a slowly varying actual temperature at the specimen. NOREM does not disclose *setting a temperature* of the VTGA to a temperature *corresponding* to *a set-point temperature*.

ASTM E1582-00 discloses *setting a temperature* of the VTGA to a temperature *corresponding* to *a set-point temperature* ***less than*** *the determined Curie temperature* of the slug by an amount equal to a first offset value", or at least 50 deg. C (Page 7, Section 11.5).

ASTM E1582-00 is evidence that ordinary workers in the field of temperature calibration would recognize the benefit of *setting a temperature* of the VTGA to a temperature *corresponding* to *a set-point temperature* ***offset from*** *the determined Curie temperature* of the slug by an amount equal to a first offset value in order to set the beginning point of the range of actual temperatures to be covered while heating the sample material to the Curie temperature.

The particular "*set-point temperature*" offset and its relation to the "*determined Curie temperature" (i.e.,* ***greater than*** *the Curie temperature by 10 degrees C)* at the beginning of the calibration, absent any criticality, is only considered to be an obvious modification of the method disclosed by NOREM and ASTM E1582-00, and is considered to be the optimum value of the set-point temperature for starting the

temperature setting program of the method disclosed by NOREM and ASTM E1582-00, as stated above, that a person having ordinary skill in the art would have been able to determine using routine experimentation based, among other things, on the desired accuracy, cost in time required for acquiring the data, etc. See *In re Boesch*, 205 USPQ 215 (CCPA 1980).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute setting a *temperature* of the VTGA to a temperature *corresponding* to *a set-point temperature* ***offset from*** *the determined Curie temperature* of the slug by an amount equal to a first offset value as taught by ASTM E1582-00, and to optimize the set-point temperature to the value ***greater than*** the Curie temperature of the slug by about 10 degrees in order to reduce the amount of data obtained while approaching the *Curie temperature* of the slug by using a minimal set-temperature range while ensuring that the *determined Curie temperature* of the slug is within the resulting range of temperature of the specimen as taught by NOREM.

With respect to (2): an incrementally stepped temperature setting program including increasing set-point temperatures by particular offset values and holding the set-point temperatures for particular time intervals as claimed by Applicant:

ASTM E1582-00 discloses a method of using a set of calibration standards comprised of a plurality of ferromagnetic slugs (Page 3, Section 8.2.2; and Page 7, Section 12.2, Table 2) to provide a temperature calibration for a VTGA. ASTM E1582-00 describes thermogravimetric apparatus, including a ***Furnace*** (page 2, section 7.1.1.1) and a ***Temperature Controller*** (page 3, section 7.1.2), capable of operating the furnace at a specified heating rate between 0.5 degrees C/min to 20 degrees C/min or to an isothermal temperature maintained constant for a minimum of 10 minutes. ASTM E1582-00 further describes (beginning on Page 7; Section 11. Procedure C) a magnetic transition (Curie Point) calibration method.

ASTM E1582-00 requires (Section 4.3.1; Page 2) the procedure must be done under the normal operating conditions of the instrument. ASTM E1582-00 discloses (Section 6.3; Page 2) that the atmosphere, purge gas, and heating conditions will affect the calibration, specifically cautioning that high heating rates should be avoided.

Differing heat exchange (emissivity and heat capacity) during the calibration and analysis will increase error in the temperature measurement and calibration.

ASTM E1582-00 discloses (Section 5.1; Page 2) the temperature axis of apparent-mass-change curves must be calibrated accurately, either by direct reading of a temperature sensor, or by adjusting the programmer temperature to match the actual temperature (of the specimen under test) over the temperature range of interest. In the latter case, this is accomplished by the use of ... magnetic transition standards.

ASTM E1582-00 discloses that is known in the art to provide a TGA with an incrementally stepped temperature setting program as claimed by Applicant in order to ensure the temperature of the sample is in equilibrium with the temperature of the heater (Page 7, Note 14).

ASTM E1582-00 is evidence that ordinary workers in the field of temperature calibration would recognize the benefit of using an incrementally stepped temperature setting program as taught by ASTM E1582-00 for the continuous ramp of NOREM in order to ensure the system is in thermal equilibrium.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute a stepped temperature program for the continuous ramp of NOREM in order to ensure the system is in thermal equilibrium as taught by ASTM E1582-00.

The optimization of the particular set-point temperature offset values (*e.g.,* 2 degrees C), rates of heating (*e.g.,* 5 degrees/minute) and holding time intervals (*e.g.,* 1 hour, 2 hours) absent any criticality, is only considered to be an obvious modification of the method disclosed by NOREM, as suggested by ASTM E1582-00, and is considered to be the optimum value of the set-point temperatures of the temperature setting program of the method suggested by NOREM and ASTM E1582-00, as stated above, that a person having ordinary skill in the art would have been able to determine using routine experimentation based, among other things, on the desired accuracy, manufacturing costs, etc. See *In re Boesch*, 205 USPQ 215 (CCPA 1980).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to increment the set-point temperatures by 2 degrees

C in order to ascertain the Curie temperature of the slug to a desired precision of about 2 degrees; and to choose rates of heating (*e.g.,* 5 degrees/minute) and holding time intervals (*e.g.,* 1 hour, 2 hours) in order to ensure the system is in thermal equilibrium as taught by ASTM E1582-00.

7. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over NOREM and ASTM E1582-00 in view of **TCHERNEV** (U. S. Patent No. 4,208,911).

NOREM and ASTM E1582-00 disclose or suggest all the limitations as claimed by Applicant in Claims 2 and 3, including the limitations of Claims 1 and 4 as described above in Paragraph 6.

Further regarding Claims 2 and 3: NOREM discloses use of a plurality of ferromagnetic standard materials for the slug (Col. 4, Lines 38-46), but does not disclose any slug comprised of an alloy containing an amount of a ferromagnetic constituent and an amount of a non-ferromagnetic constituent as claimed by Applicant in Claim 2. NOREM and ASTM E1582-00 does not disclose each of said ferromagnetic slugs is comprised of *an* alloy containing Ni and Cu, and wherein an amount of Cu is within the range of 15% to 28% as claimed by Applicant in Claim 3.

With respect to claims 2-3: the particular type of ferromagnetic slugs, absent any criticality, is only considered to be the use of a "preferred" ferromagnetic materials out of a plurality of well known ferromagnetic materials commonly used to sense a temperature at the Curie transition temperature that a person having ordinary skill in the art at the time the invention was made would have found obvious to provide using routine experimentation based, among other things, on the intended use of applicant's apparatus, *i.e.,* suitability for the intended use of applicant's apparatus for calibrating in a particular range. See *In re Leshin*, 125 USPQ 416 (CCPA 1960), where the court stated that a selection of a material on the basis of suitability for the intended use of an apparatus would be entirely obvious.

TCHERNEV discloses that a class of ferromagnetic materials (spinel ferrites) are known whose Curie temperatures can be predetermined (controlled; See Fig. 1) by choosing a predetermined amount of a ferromagnetic material (*e.g.,* Ni) and a

predetermined amount of a non-ferromagnetic material (*e.g.,* Zn) to form the alloy comprising the slug (Col. 2, Line 64 through Col. 3, Line 22).

TCHERNEV is evidence that ordinary workers in the field of magnetic materials would recognize the benefit of using a set of slugs each comprised of an alloy containing an amount of a ferromagnetic constituent and an amount of a non-ferromagnetic constituent as taught by **TCHERNEV** for the standard material slugs of NOREM in order to use a standard material having a Curie temperature close to the temperature of intended use of the VTGA as taught by NOREM and ASTM E1582-00, in order to more precisely calibrate the VTGA in the temperature range of intended use of the VTGA apparatus.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute a set of slugs each comprised of an alloy containing an amount of a ferromagnetic constituent and an amount of a non-ferromagnetic constituent for the ferromagnetic slugs of NOREM in order to more precisely calibrate the VTGA in the temperature range of intended use of the VTGA apparatus as taught by NOREM and ASTM E1582-00.

Moreover, TCHERNEV further teaches that "T" in the general formula for a spinel ferrite of the invention (Col. 2, last line) may include any metal from the "R" group that is non-ferromagnetic (*e.g.,* Cu) wherein the "R" group includes, the elements having atomic numbers 22-30, thus including Nickel (Ni, atomic number 28) and Copper (Cu, atomic number 29).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute Cu (atomic number 29) for Zn (atomic number 30) in the example shown in Fig. 1, to make an equivalent alloy containing an amount of a ferromagnetic constituent (Ni) and an amount of a non-ferromagnetic constituent (Cu), as taught by TCHERNEV, and to choose an amount of Cu in the range of 15% to 28%, by routine experimentation, in order to form slugs having the Curie transition temperature desired, in order to more precisely calibrate the VTGA in the temperature range of intended use of the VTGA apparatus as taught by NOREM and ASTM E1582-00.

Conclusion

8. It is noted, but not relied on, that Applicant has already admitted in the Specification, Page 5, Lines 14-15) that Monel, a CuNi alloy with about 28-30% by weight of Cu, has been used as a standard for the Curie point magnetic transition.

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art cited in a form PTO-892 and not mentioned above disclose related devices and methods.

- US 5,703,342 A discloses a temperature control method and desirability of holding a set temperature for predetermined time intervals in order to carry out precise, repeatable measurements.
- US 6,354,732 B1 discloses a related TGA calibration method.
- US 4,246,641 A discloses related calibration of a thermal analyzer.
- US Patents 4537517, 3850706, 3413540 and 5775810 disclose related magnetic materials and devices.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stanley J. Pruchnic, Jr., whose telephone number is **(571) 272-2248**. The examiner can normally be reached on weekdays (Monday through Friday) from 7:30 AM to 4:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego F. F. Gutierrez can be reached at **(571) 272-2245**.

The ***Official FAX*** number for Technology Center 2800 is **(703) 872-9306** for ***all official communications***.

Any inquiry of a general nature or relating to the status of this application or proceeding may be directed to the official USPTO website at **http://www.uspto.gov/** or you may call the **USPTO Call Center** at **800-786-9199** or 703-308-4357. The Technology Center 2800 Customer Service FAX phone number is (703) 872-9317.

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sbp

Stanley J. Pruchnic, Jr.
6/25/04

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